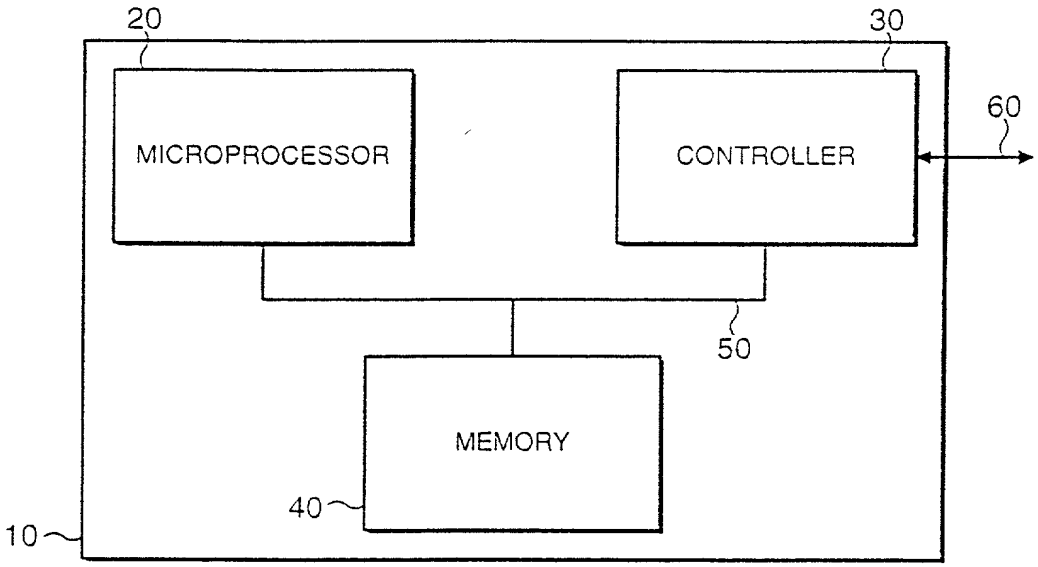
20
30
MICROPROCESSOR
CONTROLLER
60
50
MEMORY
40
10

FIG. 1

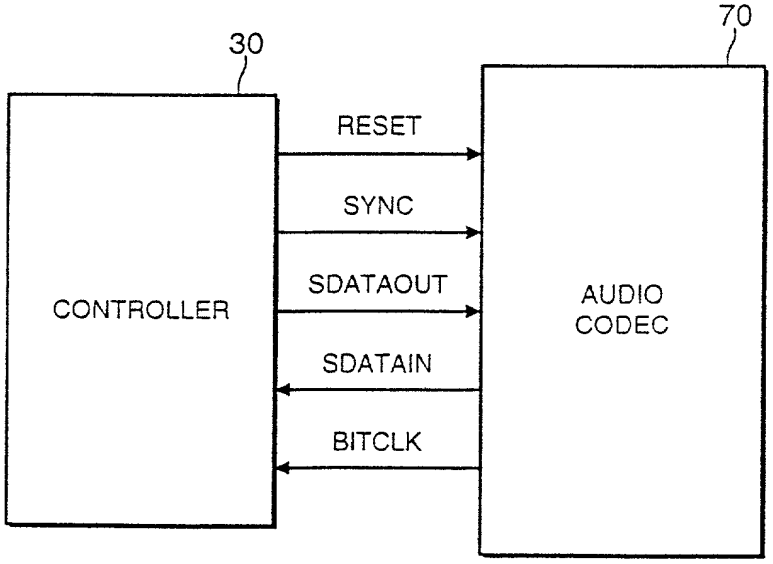
30
70
CONTROLLER
RESET
SYNC
SDATAOUT
SDATAIN
BITCLK
AUDIO
CODEC

FIG. 2

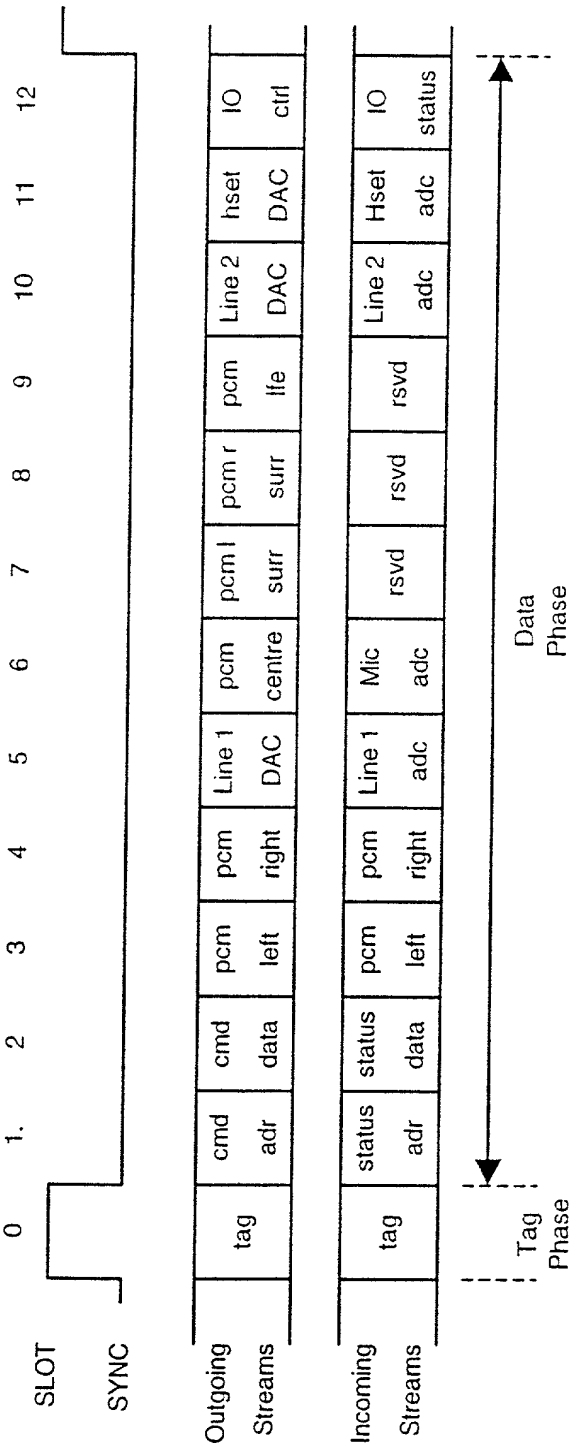
SLOT
SYNC
0
1.
2
3
4
5
6
7
8
9
10
11
12
Outgoing Streams
tag
cmd adr
cmd data
pcm left
pcm right
Line 1 DAC
pcm centre
pcm l surr
pcm r surr
pcm lfe
Line 2 DAC
hset DAC
IO ctrl
Incoming Streams
tag
status adr
status data
pcm left
pcm right
Line 1 adc
Mic adc
rsvd
rsvd
rsvd
Line 2 adc
Hset adc
IO status
Tag Phase
Data Phase

FIG. 3

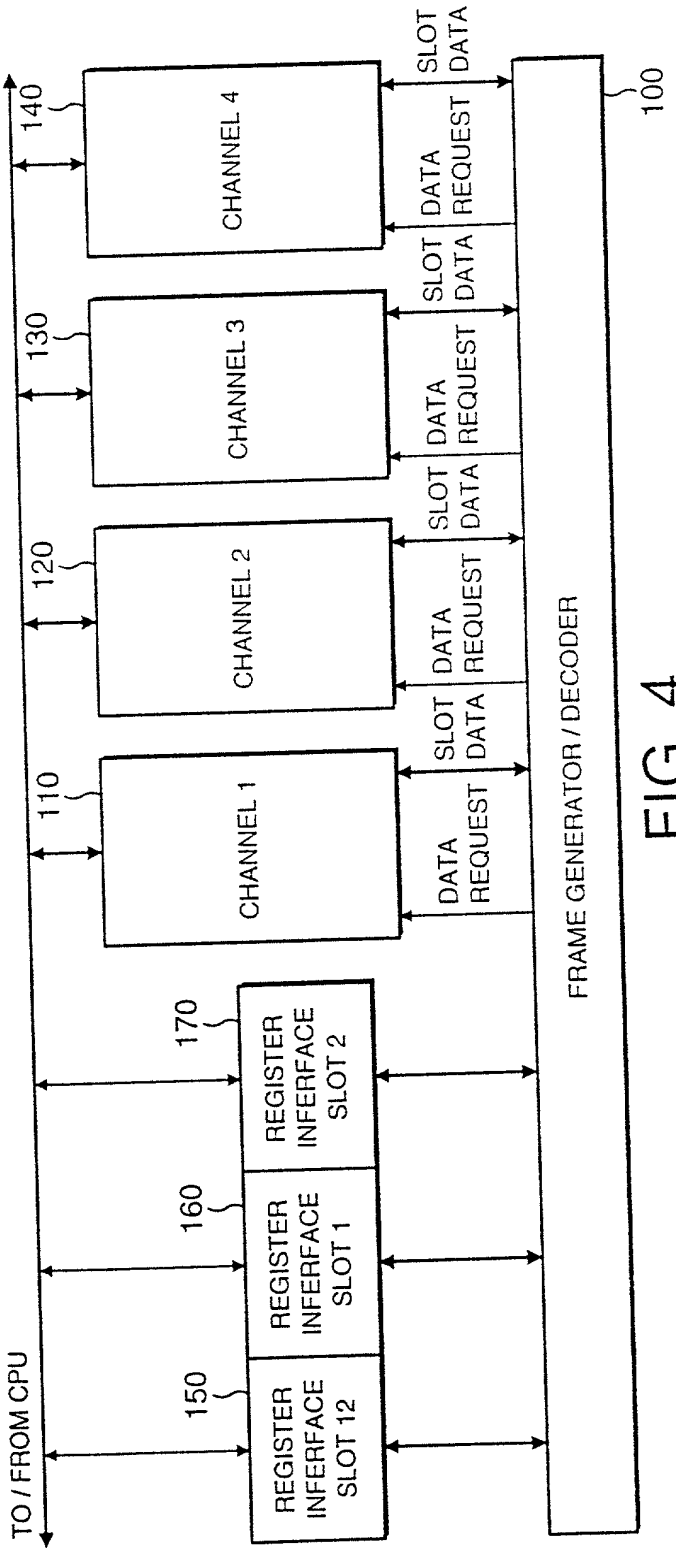
TO / FROM CPU
150
160
170
REGISTER INFERFACE SLOT 12
REGISTER INFERFACE SLOT 1
REGISTER INFERFACE SLOT 2
110
120
130
140
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
DATA REQUEST
SLOT DATA
FRAME GENERATOR / DECODER
100

FIG. 4

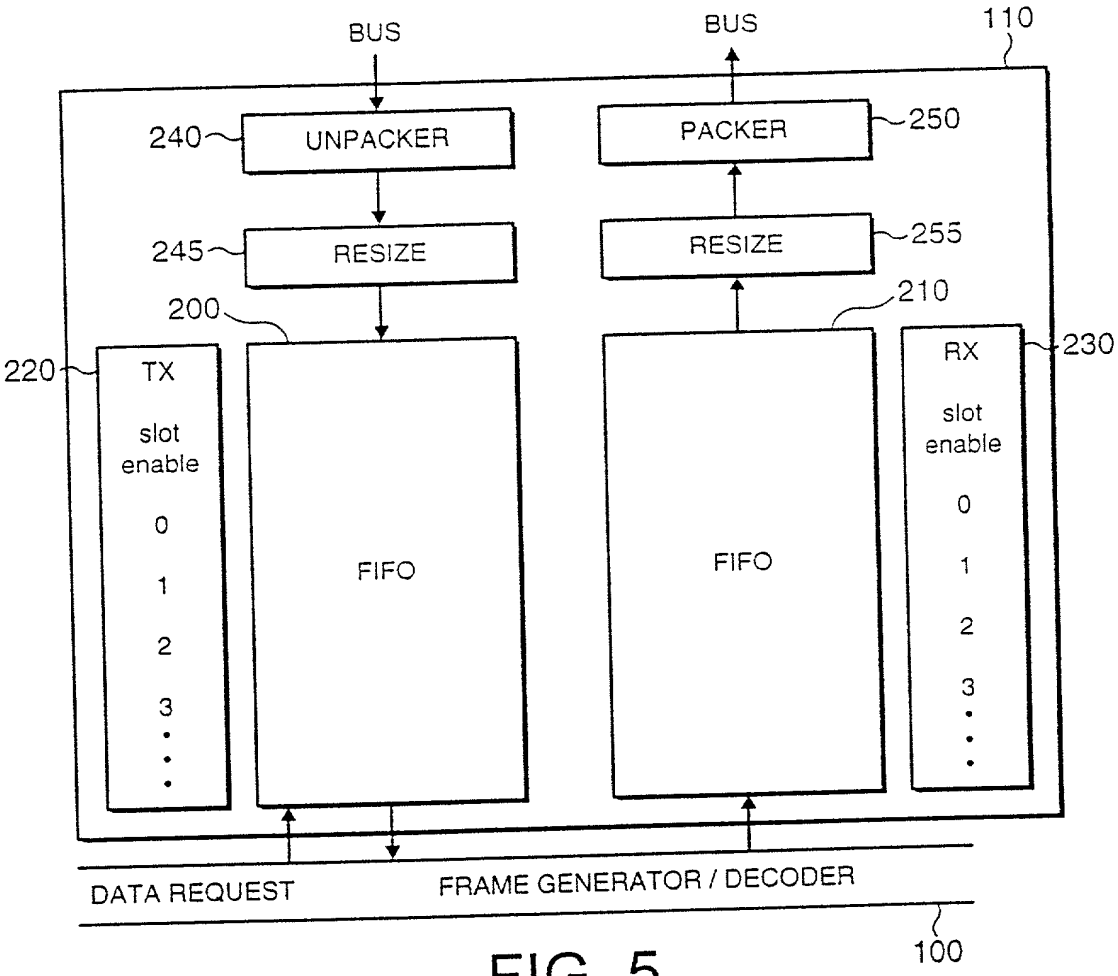
BUS
BUS
110
240
UNPACKER
PACKER
250
245
RESIZE
RESIZE
255
200
210
220
TX
slot enable
0
1
2
3
FIFO
FIFO
RX
slot enable
0
1
2
3
230
DATA REQUEST
FRAME GENERATOR / DECODER
100

FIG. 5

Bits	Name	Function
15	CM	Compact mode enable. If this bit is set to 1 and the RSIZE value is either 12 or 16 the two data words will be compacted into a 32-bit word for reading by the CPU. If set to 0 a 32-bit word will contain one slot data.
14:13	RSIZE	00 – data is 16 bits 01 – data is 18 bits 10 – data is 20 bits 11 – data is 12 bits
12	RX12	FIFO stores SLOT12 data (takes precedence over individual SLOT 12 register)
11	RX11	FIFO stores SLOT11 data
10	RX10	FIFO stores SLOT10 data
9	RX9	FIFO stores SLOT9 data
8	RX8	FIFO stores SLOT8 data
7	RX7	FIFO stores SLOT7 data
6	RX6	FIFO stores SLOT6 data
5	RX5	FIFO stores SLOT5 data
4	RX4	FIFO stores SLOT4 data
3	RX3	FIFO stores SLOT3 data
2	RX2	FIFO stores SLOT2 data (only use if sampling rate is 48KHz)
1	RX1	FIFO stores SLOT1 data (only use if sampling rate is 48KHz)

FIG. 6

Bits	Name	Type	Function
15	CM	Read/write	Compact mode enable. If this bit is set to 1 and the TSIZE value is either 12 or 16 the two data words will be compacted into a 32-bit word for reading by the CPU. If set to 0 a 32-bit word will contain one slot data.
14:13	TSIZE	Read/write	00 – data is 16 bits 01 – data is 18 bits 10 – data is 20 bits 11 – data is 12 bits
12	TX12	Read/write	FIFO contains SLOT12 data (takes precedence over SLOT12RXTX)
11	TX11	Read/write	FIFO contains SLOT11 data
10	TX10	Read/write	FIFO contains SLOT10 data
9	TX9	Read/write	FIFO contains SLOT9 data
8	TX8	Read/write	FIFO contains SLOT8 data
7	TX7	Read/write	FIFO contains SLOT7 data
6	TX6	Read/write	FIFO contains SLOT6 data
5	TX5	Read/write	FIFO contains SLOT5 data
4	TX4	Read/write	FIFO contains SLOT4 data
3	TX3	Read/write	FIFO contains SLOT3 data
2	TX2	Read/write	FIFO contains SLOT2 data (only use if sampling rate is 48KHz)
1	TX1	Read/write	FIFO contains SLOT1 data (only use if sampling rate is 48KHz)

FIG. 7

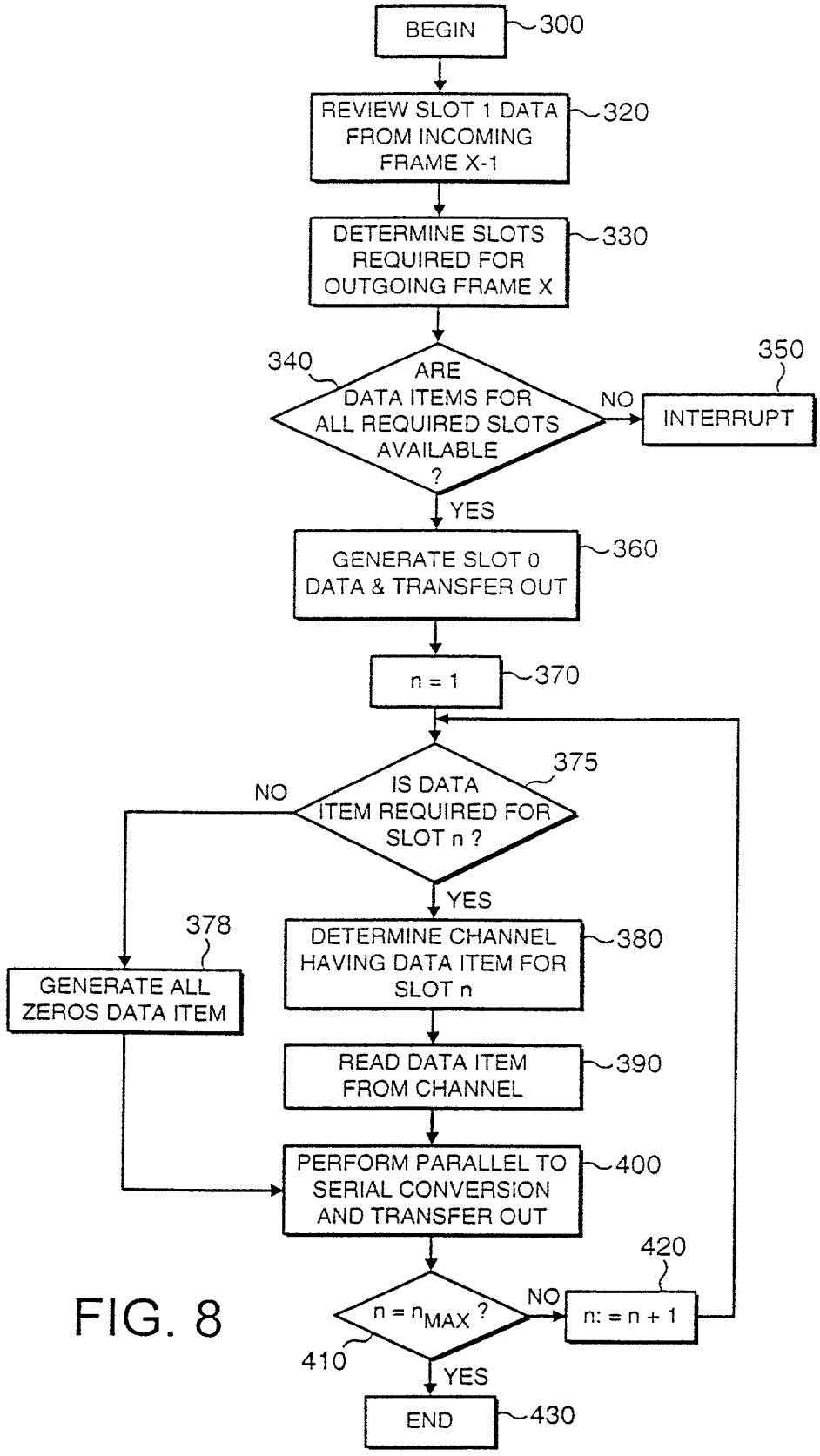
BEGIN
300
REVIEW SLOT 1 DATA FROM INCOMING FRAME X-1
320
DETERMINE SLOTS REQUIRED FOR OUTGOING FRAME X
330
340
ARE DATA ITEMS FOR ALL REQUIRED SLOTS AVAILABLE ?
NO
350
INTERRUPT
YES
GENERATE SLOT 0 DATA & TRANSFER OUT
360
n = 1
370
375
IS DATA ITEM REQUIRED FOR SLOT n ?
NO
YES
378
GENERATE ALL ZEROS DATA ITEM
DETERMINE CHANNEL HAVING DATA ITEM FOR SLOT n
380
READ DATA ITEM FROM CHANNEL
390
PERFORM PARALLEL TO SERIAL CONVERSION AND TRANSFER OUT
400
420
n = nMAX ?
NO
n: = n + 1
410
YES
END
430

FIG. 8

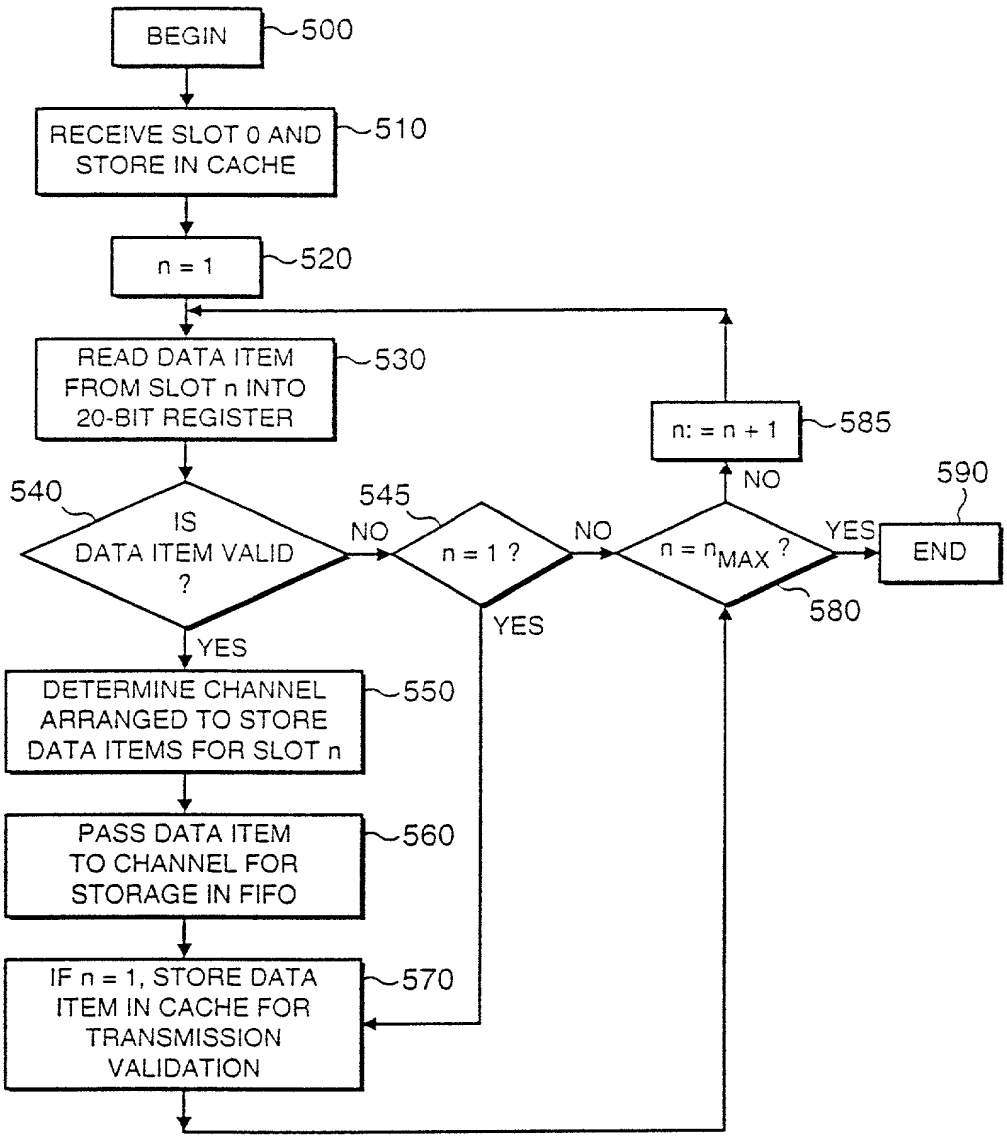
BEGIN
500
RECEIVE SLOT 0 AND STORE IN CACHE
510
n = 1
520
READ DATA ITEM FROM SLOT n INTO 20-BIT REGISTER
530
540
IS DATA ITEM VALID ?
NO
545
n = 1 ?
NO
n = n_{MAX} ?
YES
END
590
NO
n: = n + 1
585
580
YES
YES
DETERMINE CHANNEL ARRANGED TO STORE DATA ITEMS FOR SLOT n
550
PASS DATA ITEM TO CHANNEL FOR STORAGE IN FIFO
560
IF n = 1, STORE DATA ITEM IN CACHE FOR TRANSMISSION VALIDATION
570

FIG. 9

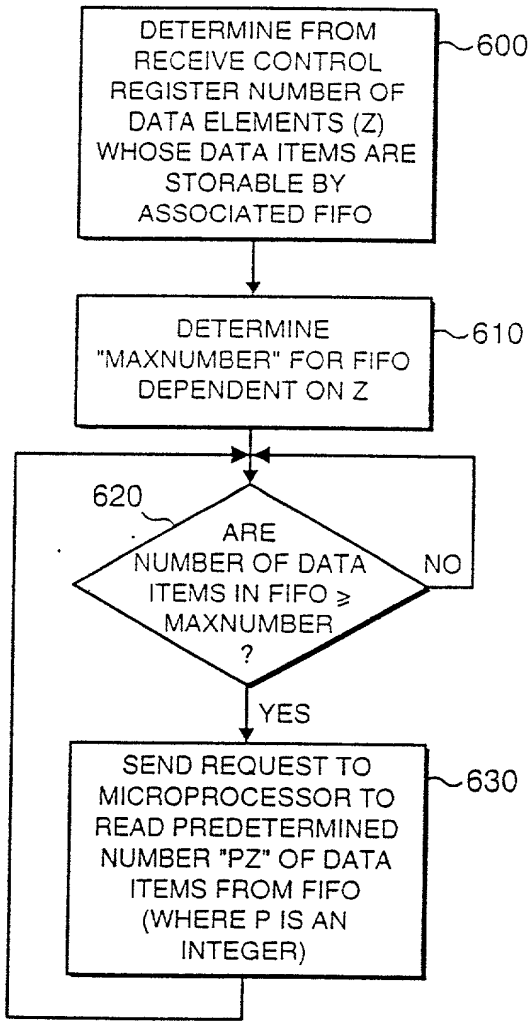
DETERMINE FROM RECEIVE CONTROL REGISTER NUMBER OF DATA ELEMENTS (Z) WHOSE DATA ITEMS ARE STORABLE BY ASSOCIATED FIFO
600
DETERMINE "MAXNUMBER" FOR FIFO DEPENDENT ON Z
610
620
ARE NUMBER OF DATA ITEMS IN FIFO ≥ MAXNUMBER ?
NO
YES
SEND REQUEST TO MICROPROCESSOR TO READ PREDETERMINED NUMBER "PZ" OF DATA ITEMS FROM FIFO (WHERE P IS AN INTEGER)
630

FIG. 10

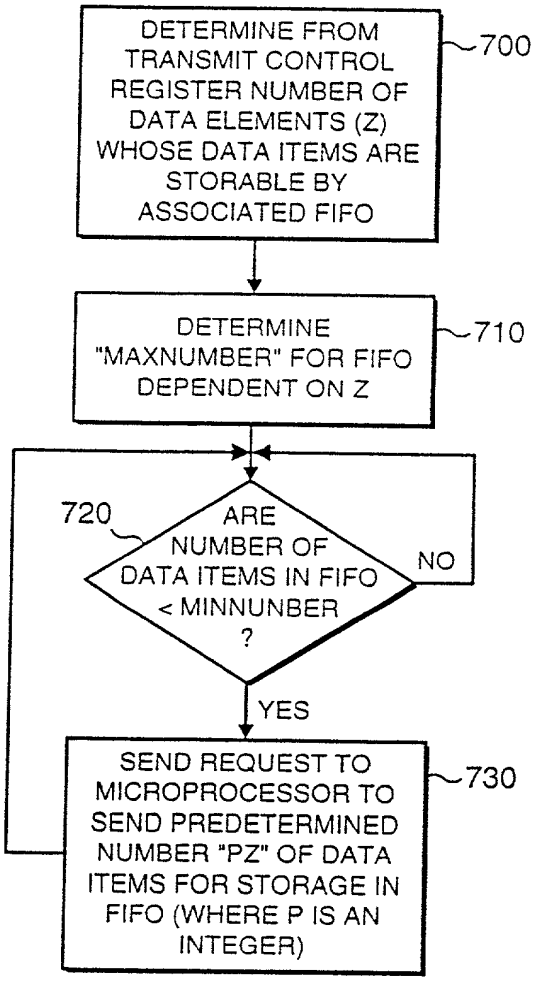
DETERMINE FROM TRANSMIT CONTROL REGISTER NUMBER OF DATA ELEMENTS (Z) WHOSE DATA ITEMS ARE STORABLE BY ASSOCIATED FIFO
700
DETERMINE "MAXNUMBER" FOR FIFO DEPENDENT ON Z
710
720
ARE NUMBER OF DATA ITEMS IN FIFO < MINNUNBER ?
NO
YES
SEND REQUEST TO MICROPROCESSOR TO SEND PREDETERMINED NUMBER "PZ" OF DATA ITEMS FOR STORAGE IN FIFO (WHERE P IS AN INTEGER)
730

FIG. 11